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PAPERS FROM THE DEPARTMENT
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GEOLOGY.

No. 10.—MEMOIR OF SIR J. WILLIAM DAWSON.

BY

FRANK D. ADAMS, PH.D.

WITH ONE PLATE.

[Rep ulletin Geological Society of America, Vol. 11, 1899.]

MONTREAL, 1900.

MEMOIR OF SIR J. WILLIAM DAWSON

BY

FRANK D. ADAMS

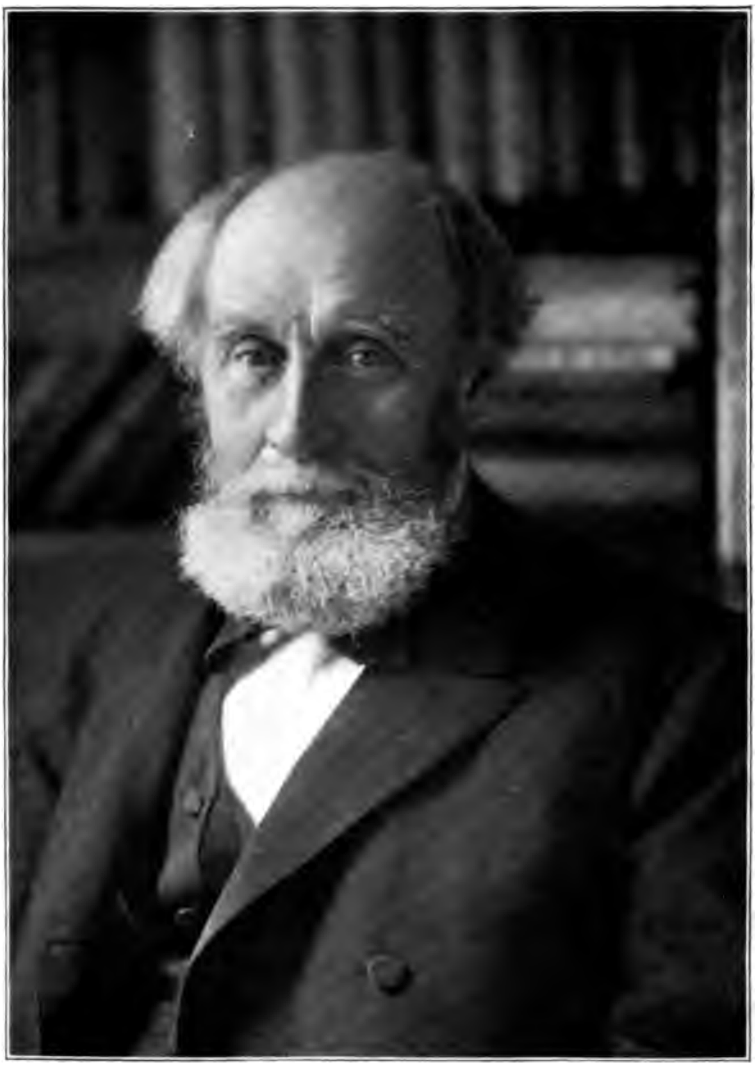
[From Bull. Geol. Soc. Am., Vol. 11, 1900]

MEMOIR OF SIR J. WILLIAM DAWSON

BY FRANK D. ADAMS

It is with deep regret that we record the death of Sir William Dawson, which took place at Montreal on the morning of November 19, in the eightieth year of his age. In him Canada loses a distinguished geologist and naturalist, as well as one who was intimately identified with educational work of all kinds, but more especially with higher education in the province of Quebec.

Sir John William Dawson, having been born at Pictou on October 13, 1820, was a native of Nova Scotia, a province which has produced more than its share of the Canadians who have risen to eminence in the various walks of life. His father, James Dawson, was from near Aberdeen, Scotland, and came to Nova Scotia to fill a position in a leading business house in Pictou, and on the termination of his engagement began business on his own account, becoming in the course of time one of the chief ship-builders in that part of Nova Scotia. James Dawson had but two children, of whom Sir William was the elder. The younger died at an early age, leaving Sir William thus the sole survivor of the family.



Truly yours

J Wm Dawson

While still at school in Pictou, at the age of twelve he developed a love for natural science, inherited from his father, and made large collections of fossil plants from the Nova Scotia Coal Measures, so well exposed about his native place. He speaks of himself at that time as being a "moderately diligent, but not a specially brilliant pupil." On leaving school he studied at Pictou College and subsequently at the University of Edinburgh. While at the former seat of learning, at the age of sixteen, he read before the local natural history society his first paper, having the somewhat ambitious title "On the structure and history of the earth."

At Edinburgh he studied under Jamieson, Forbes, and Balfour, as well as with Alexander Rose, whom he refers to in some notes and reminiscences as a single-hearted mineralogist and the greatest authority on the mineralogy of Scotland. He records his impression of the University of Edinburgh at that time as being "a very imperfect school of natural science in comparison with our modern institutions," and adds: "Jamieson, who was my principal teacher, devoted a large portion of the earlier lectures of his course to physiography, and the rest to minerals and rocks, but I was surprised to find how little even some of the most eminent English geologists of the day knew of mineralogy, and how uncertain in consequence was their diagnosis in the field of the nature of rock masses."

In 1841 he met, however, two men with whom he was afterward intimately associated in his work—Sir Charles Lyell, who more than any other man gave form to modern geological science, and Sir William Logan, who gave the first great impetus to the study of the older rocks of the northern half of the North American continent and who founded the Geological Survey of Canada.

He returned to Nova Scotia in 1847, and two years later went to Halifax to give a course of lectures on natural history subjects in connection with Dalhousie College, and organized classes for practical work in mineralogy and paleontology. These were attended by students, citizens, and pupils of higher schools—a foreshadowing of university extension. In 1850, at the age of 30, having already attracted some attention by the publication of a number of papers, reports, and lectures, he was appointed Superintendent of Education for Nova Scotia. His work in connection with this position obliged him to travel continually through all parts of the province, and on these journeys he accumulated that immense mass of information concerning the geology and mineral resources of Nova Scotia which is incorporated in his largest work—that entitled "Acadian Geology."

Sir Charles Lyell, in 1841, on his first visit to America, met Sir William and was by him conducted to many places of geological interest in Nova Scotia, and on his subsequent visit in 1852 they together continued their studies in Nova Scotian geology. In a letter to Leonard Horner, dated September 12 of this year, Lyell writes:

> "My companion, J. W. Dawson, is continually referring to the curious botanical points respecting calamites, endogenites, and other coal plants, on which light is thrown by certain specimens collected by him at Pictou. He told me that the root of the pond lily *Nymphæa odorata*, most resembled Stigmaria in the regularity of its growth, and Doctor Robb showed me a dried specimen, a rhizoma, which being of a totally different family and therefore not strictly like, still suggests the probability of the Stigmaria having grown in slush in like manner."

And in another part of the same letter he, referring to the now celebrated Joggins section on the coast of Nova Scotia, says:

> "Dawson and I set to work and measured foot by foot many hundred yards of the cliffs, where forests of erect trees and calamites most abound. It was hard work, as the wind one day was stormy, and we had to look sharp lest the rocking of living trees just ready to fall from the top of the undermined cliff should cause some of the old fossil ones to come down upon us by the run. But I never enjoyed the reading of a marvelous chapter of the big volume more. We missed a botanical aide-de-camp much when we came to the top and bottoms of calamites and all sorts of strange pranks which some of the compressed trees played."

In 1854 Forbes, who was professor of geology and zoology in the University of Edinburgh, died, and Lyell wrote to Sir William, advising him to apply for the chair, promising him his support and that of a number of his influential friends, while Sir William's "Acadian Geology," which had just been published in Edinburgh, testified to his abundant fitness for the position. He was about to set sail for Scotland to prosecute his candidature for the chair when he received word that the place had been filled, sooner than had been anticipated, by the appointment of a zoologist who had been strongly supported by the medical school of the university, but, by a strange coincidence, he received, almost on the very day that he was to sail for Scotland, a letter offering him the principalship of McGill University.

This institution, founded by royal charter in 1821, had made but slow progress in its earlier years, and was at this time, through litigation and other causes, almost in a state of collapse. Sir William, then Mr Dawson, was pointed out to the governors of the college by Sir Edmund Head, then Governor-General of Canada, as a man who, if his services could be secured, was eminently fitted to undertake the task of reconstructing it.

The services of Mr Dawson were accordingly secured, and in 1855 he assumed the principalship of McGill University, stipulating at the same time that the chair of natural history should be assigned to him.

The university as he found it had three faculties and but sixteen professors, a number of whom gave only a portion of their time to university work, while the buildings and equipment were wretched. When it is stated that the university has now one hundred and twenty professors and instructors of various grades and an equipment which is in all departments fairly good and in some of them unsurpassed, some idea may be gained of the progress which the institution made under Sir William Dawson's care and guidance.

As professor of natural science Sir William at this time delivered courses in chemistry, botany, zoology, and geology, and natural science became a very favorite study among the students, for he was an excellent lecturer, and his enthusiasm for these subjects was communicated to all who heard him. As years went on the instruction in the first three of these subjects was undertaken by others, and a special chair of geology and paleontology was endowed by his old friend and co-worker, Sir William Logan, a chair which he held until his final retirement. His teaching work, however, formed but a small part of his daily labors. In addition to administering the affairs of the university, he was first and foremost in every movement to further education in the province, and no educational board was complete without him. He was the honorary president of the Natural History Society and never missed a meeting or a field day, and also identified himself closely with many other societies in Montreal, and spared neither time nor labor in their behalf.

Over and above all this he found time to carry out original work along several lines, achieving most valuable results, as well as to write many popular works on science, more especially in its relation to religion. Original investigation he always considered to be one of the chief duties and pleasures of a man of science. Most of his work along these lines was done during his summer vacations; in fact, he was led to accept the position of principal in McGill chiefly by the fact that the vacations gave him leisure and opportunity for work of this kind.

He was always very progressive in his ideas relative to the scope and development of university teaching, and was continually urging the endowment of new chairs and the broadening of university work, so that all young men wishing to train themselves for the higher walks of life might in the university find their needs supplied. As an instance of this it may be mentioned that so far back as 1858 he succeeded in establishing a school of civil engineering, which, after a severe struggle of five years, succumbed to some unfriendly legislation, only, however to be revived by him in 1871, and developed into the present faculty of applied science of McGill University, with its numerous departments, its full staff of instructors, and excellent equipment. Sir William, furthermore, never hesitated, if funds were not forthcoming in sufficient amount for these purposes, to subscribe large sums out of his own limited private means, and he was also the continual helper of needy students desiring to avail themselves of the university's teaching.

Sir William received the degree of M. A. from the University of Edinburgh in 1856 and the degree of LL. D. from the same university in 1884. His attainments and the value of his contributions to science were widely recognized, and he was elected an honorary or corresponding member of many learned societies on both sides of the Atlantic. He was made a Fellow of the Geological Society of London in 1854 and of the Royal Society in 1862. He was the first president of the Royal Society of Canada, and has occupied the same position in the Geological Society of America and in both the American and British Associations for the Advancement of Science.

In 1883 he attended the meeting of the British Association for the Advancement of Science, at Southport, in the interest of the meeting in Montreal in the following year, and spent the ensuing winter in Egypt and Syria studying the geology of those countries, more especially in its relation to sacred history, and accumulated much information on this subject, which appeared later in his book entitled " Modern Science in Bible Lands," as well as in other books and papers which he published subsequently.

He took an active part in the organization and proceedings of the meeting of the British Association for the Advancement of Science in Montreal in 1884, on the occasion of which he received the honor of knighthood.

In 1893 Sir William was seized with a very severe attack of pneumonia, and his health became so seriously impaired that he was obliged to give up his work for a time and spend the winter in the southern United States. His strength, however, was not restored, and he resigned his position as principal of McGill University in June, 1893, and retired from active work. During the later years of his life his strength gradually ebbed away, and what little work he could undertake consisted in arranging his collections and working on some unfinished papers. Several of these were published in 1894 and 1895; but the years of quiet labor in his favorite pursuits to which he looked forward at this time were cut short by a series of sharp attacks, culminating in partial paralysis, which forbade further effort. He passed away on the 19th of November peacefully and without pain.

Lady Dawson, with three sons and two daughters, survive him. His eldest son, Doctor George M. Dawson, the present director of the Geological Survey of Canada, has inherited his father's taste for geological studies and has achieved wide distinction in the world of science.

Sir William's first original contribution to science was a paper read before the Wernerian Society of Edinburgh in 1841 on a species of field mouse found in Nova Scotia. From that time onward he was a continuous contributor to scientific journals and to the publications of various learned societies. His papers were very numerous and covered a wide range of subjects in the domain of natural history. The most important work of his earlier years was an extended study of the geology of the eastern maritime provinces of the Dominion of Canada. His results are embodied in his "Acadian Geology," already mentioned. It is a volume of nearly 1000 pages, is accompanied by a colored geological map of Nova Scotia, and has passed through four editions. In writing to Sir William in 1868 Sir Charles Lyell says of this work:

> "I have been reading it steadily and with increased pleasure and profit. It is so full of original observations and sound theoretical views that it must, I think, make its way, and will certainly be highly prized by the more advanced scientific readers."

It is the most complete account which he have of the geology of Nova Scotia, New Brunswick, and Prince Edward island, although since it appeared large portions of these provinces have been mapped in detail by the Geological Survey of Canada and Sir William's conclusions modified in some particulars. In carrying out this work Sir William paid especial attention to the paleontology of the Carboniferous system and to the whole question of the nature and mode of accumulation of coal. He subsequently studied the paleontology of the Devonian and Upper Silurian systems of Canada, discovering many new and important forms of plant life.

In 1884 he began the study of the Cretaceous and Tertiary fossil plants of western Canada, and published the first of a series of papers on the successive floras from the Lower Cretaceous onward, which appeared in the Transactions of the Royal Society of Canada. He also contributed a volume, entitled "The Geological History of Plants," to Appleton's International Scientific Series. In 1863 he published his "Air breathers of the Coal period," in which were collected the results of many years' study in the fossil batrachians and the land animals of the Coal Measures of Nova Scotia. The earliest known remains of Microsauria were then discovered by him in the interior of decayed tree stumps in the Coal Measures of South Joggins. The results of his later studies in these creatures were embodied in a series of subsequent papers which appeared from time to time.

On taking up his residence in Montreal his attention was attracted to the remarkable development of Pleistocene deposits exposed in the vicinity of the city, and he undertook a detailed study of them, and especially of the remarkably rich fossil fauna which they contain. He also studied subsequently the Pleistocene deposits of the lower Saint Lawrence river and instituted comparisons between them and the present fauna of the gulf of Saint Lawrence and of the Labrador coast.

He was led by these studies to believe that the deposits in question had been accumulated largely through the action of sea-borne ice, and being anxious to study the evidence on which the continental geologists had based their views of the high efficiency of land ice as an eroding agent, he visited Switzerland in 1865 and there studied the phenomena of glacial action. By these studies he was led to attribute much less importance to land ice as an eroding agent than was commonly assigned to it. "I was also led to believe," he wrote shortly before his death, "that while the carrying power of a glacier is undoubtedly great, it is altogether inferior to that of sea-borne ice, whether in the form of ice-fields, grinding on the shores, or of icebergs, and these views, arrived at and published in 1865, I have ever since consistently maintained."

The results of his studies on the Canadian Pleistocene appeared in a series of papers as the work progressed, and were finally embodied in a volume entitled "The Canadian Ice Age," which was issued in 1893 as one of the publications of the Peter Redpath Museum of McGill University. This is one of the most important contributions to the paleontology of the Pleistocene which has hitherto appeared.

As Sir William was always much more interested in the history of life than in any of the inorganic aspects of the science of geology, he considered one of his most important contributions to scientific knowledge to be the discovery of *Eozoon canadense.* The true character of this remarkable object, concerning which there has been so much discussion, can hardly be considered even yet as definitely settled. Its resemblance microscopically to certain organic forms is so remarkable that some of the most experienced observers have accepted it as of organic origin. Its field relations, however, leave but little doubt that it is inorganic.

The literature of this subject, which includes many papers by Sir William, is quite voluminous, but the chief facts are summed up in his book entitled "The Dawn of Life," which appeared in 1875.

Sir William was also a prolific writer of popular works on various geological topics. Among these may be mentioned his "Story of the earth and man," his "Fossil men and their modern representatives," his "Meeting place of geology and history," and his "Modern science in Bible lands." These books, all written in a very entertaining style, had a wide circle of readers, and many of them passed through several editions.

Other volumes from his pen, as well as many papers contributed to various religious publications, treated of the relation of science and religion. One of the earliest of these was entitled "Archaia," and dealt with the relations of historical geology to the Mosaic account of the creation. In others he considered the relation of the evolutionary hypothesis to religious thought.

Sir William was a Presbyterian of the old school and strongly opposed to all theories of the evolution of man from brute ancestors, nor would he allow anything more than a very moderate antiquity for the species.

The study of geology, too, he would have emancipated from "that materialistic infidelity which by robbing nature of the spiritual element and of its presiding divinity makes science dry, barren, and repulsive and diminishes its educational value."

These works on the relation of science and religion, while they undoubtedly met a popular need, have but a transitory value, and they are not the works by which Sir William Dawson will be remembered. His reputation is founded on the great contributions to our permanent stock of knowledge which he has made and which are embodied in his works on pure science, representing achievements of which any man might well be proud. His name has been perpetuated in connection with the geological department of his university by the establishment of a second chair in geology, to be known as the Dawson chair, which has just been endowed in his memory by Sir William Macdonald.

Sir William was a man of quiet geniality, gentle and even deferential in manner, but decided in opinion and firm in action. The pre-eminent note of his character was sincerity and singleness of purpose. His loss will be felt by all who knew him, but especially by the members of the university with which he was so long connected.

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